

accordance with such modifications as may be introduced later with the consent of the States represented.

(b) To control the apparatus and to insure uniformity of methods.

(c) To undertake such particular work as may be entrusted to it by the participating Governments.

(d) To publish periodical reports and papers which may prove useful in carrying out the co-operative work.

(e) To decide the graphic representations, scales, signs and colours to be used in the charts for the purpose of obtaining uniformity in the publications.

(f) To make, in connection with the investigations, application to the telegraph administrations for the purpose of obtaining determinations from time to time of the changes in the resistance of the cables which cross the areas in any direction.

II. (a) The permanent international Council should consist of commissioners elected by the Governments interested. Each Government may appoint two commissioners who may be represented at meetings by substitutes.

(b) The Council elects its president and vice-president, and appoints all officials connected with the central bureau. Should the general secretary represent hydrographical sciences, his principal assistant should represent the biological sciences, or *vice versa*.

(c) The Council shall draw up its own order of proceedings.

(d) The expenses of the central office are approximately estimated at 4800*l.* (96,000 marks) yearly.

(e) The place of the central bureau, to be decided by the Governments concerned, shall at the same time be the residence of the general secretary, and should be conveniently situated for hydrographical and biological researches.

(f) It will be for the Governments concerned to decide among themselves the share to be borne by each.

Scheme for the Expenditure of the Central Bureau.

(1) General Secretary	750
(2) Principal Assistant	500
(3) President, for incidental expenses other than travelling expenses	200
(4) Vice-President, for incidental expenses other than travelling expenses	100
(5) Office, laboratory, scientific and technical assistants, draughtsmen, clerks, servants, postage, telegrams and similar expenses	2250
(6) Travelling expenses	300
Note: Travelling expenses of commissioners attending meetings of the Council shall be borne by their respective Governments.	
(7) Printing	500
(8) Incidental expenses	200
	<u>£4800</u>

D.—It is desirable that these investigations should begin May 1, 1901.

E.—The Conference declares that it is of the greatest importance, both for high sea fisheries and for the weather forecasts for long periods, that the Farøe Islands and Iceland should be included in the European telegraph system as soon as possible.

F.—The relation between the quantity of halogen contained in the water and the density of the water shall be carefully investigated by an experimental revision of the tables compiled by Knudsen (Ingolf Exp. ii. 37). The tables compiled by Makaroff, Krümmel and others for the relation of specific gravity to density and salinity are likewise in urgent need of experimental revision.

It is proposed to undertake these investigations in the technical institute at Copenhagen under the direction of a committee consisting of Sir John Murray, Messrs. Knudsen, Pettersson, Nansen, Krümmel, H. N. Dickson, and Makaroff. The means for carrying out these works are to be requested from such learned societies as have funds for such purposes.

G.—The Conference recommends that these resolutions be brought by the nations concerned to the knowledge of the Governments of France and Belgium.

H.—In case the resolutions of the Conference should be accepted by the States, it is anticipated that some length of time will elapse before the organisation of the central bureau is completed. In the meantime the Governments may wish to

possess an organisation in connection with this Conference which may be useful in constituting the Council and the central bureau.

The members of the third committee—Åkerman, Drechsel, Von Grimm, Herwig, Hoek, J. Murray, Nansen, Pettersson—hereby offer their services for this purpose.

Appendix I. is on the quantitative estimation of pelagic fish-eggs and larvæ, by Prof. Hensen; Appendix II., on the Central Laboratory, by Prof. Nansen; Appendix III., on plankton investigations, by Profs. Cleve and Pettersson; and Appendix IV., on the marking of fishes in the waters of the region of the Baltic and the North Sea, by Dr. Trybom.

NOTES.

ONE of the most transcendent sights that it is given to man to witness is due next week. Those who saw the "falling stars" of 1866 readily acknowledge that there is no other phenomenon which is equal to it in majesty and enthralling beauty; and although comparisons are always odious, and generally misleading, some have held that the 1866 display was far more striking than a total eclipse of the sun. It is to be hoped, therefore, that the sky will be clear during the early mornings of next week. It appears from a communication of Messrs. Johnstone Stoney and Downing, which appears in another column, that it is not yet known whether the densest part of the meteors will be encountered on the morning of the 15th or during the next night. It is to be regretted that bright moonlight will certainly prevent the shower from being seen with the same effect as in 1866, if it should happen before the morning hours.

CERTAINLY not for many years has there been so much anxiety, either expressed or silently borne, as since some days ago, when the wire joining Ladysmith and civilisation was broken. Not only have the relatives of the 10,000 Britons beleaguered there been anxious, but all who take interest in the severe struggle which is now going on. It has been a matter of general surprise that in a campaign in which the cutting of telegraph wires was the first thing to be expected, and the investment of several isolated garrisons for a time was to be taken for granted, Marconi apparatus was not installed as a matter of course. We do not share this surprise; science, and especially the latest developments of science, are the last things to interest our Government and the Government Departments; they do not believe in science, they care to know very little about it, and the scientific spirit is absent from too many of their plans and doings. Hence we have now to be thankful that they have reached the level of the pigeon post, which has been the only official means, and that on the part of one or two birds, to keep us in touch with our beleaguered forces. It is stated that even the Commander in Chief, Lord Wolseley, has expressed some surprise that the so-called "Intelligence Department" of the Army allowed the Ladysmith force to go to the front with mountain guns against a Boer force which they should have known might be armed with Schneider-Canet cannons of large calibre; and it would seem that probably a terrible disaster has been prevented, not by our Intelligence Department, not by the outfit of our Army, but by the apparently accidental arrival of naval guns and *personnel* at the last moment. Why is there not a Scientific Committee to do what it can in advising the military authorities? If they could do nothing, nobody would be the worse, but they might be able to do much to the nation's advantage.

At the anniversary meeting of the Royal Society on November 30, the following Fellows will be recommended by the President and Council of the Royal Society for election into the Council for the year 1900. The names of new members

are printed in italics:—President: Lord Lister. Treasurer: Alfred Bray Kempe. Secretaries: Sir Michael Foster, K.C.B., Prof. Arthur William Rücker. Foreign Secretary: *Dr. Thomas Edward Thorpe*. Other members of the Council: *Horace T. Brown*, Captain Ettrick William Creak, R.N., Prof. James Dewar, *Prof. Edwin Bailey Elliott*, *Dr. Hans Friedrich Gadow*, Prof. William Dobinson Halliburton, Prof. William Abbott Herdman, *Sir John Murray, K.C.B.*, Sir Andrew Noble, K.C.B., *Prof. Arnold William Reinold*, Dr. George Johnstone Stoney, *George James Symons, J. J. H. Teall*, Prof. Joseph John Thomson, *Prof. Edward Burnett Tylor, Sir Samuel Wilks, Bart.*

THE gold medal of the Highland and Agricultural Society of Scotland has been awarded to Prof. Cossar Ewart in recognition of his intercrossing and other experiments. Seeing that the Scottish Agricultural Society has a reserve fund of well nigh 100,000*l.*, and that there was a clear profit of over 4000*l.* at the last show—the show at which Prof. Ewart's zebra hybrids attracted so much attention—it is a matter of some surprise that the directors of the Society have not ere this voted a substantial sum in aid of the extremely costly experiments which for some years have been steadily carried on in the vicinity of Edinburgh.

DR. W. H. CORFIELD, professor of hygiene and public health in University College, London, has been appointed to the newly-created post of consulting sanitary adviser to Her Majesty's Office of Works, for the Royal Palaces and Public Buildings in charge of the Department.

AT the recent annual meeting of the Royal Academy of Medicine in Ireland, the following distinguished men of science were elected honorary Fellows of the Academy: Sir J. Burdon-Sanderson, Bart., F.R.S.; Prof. Howard Kelly, Baltimore; Prof. Koch, Berlin; Prof. Kocher, Bern; Prof. Th. Leber, Heidelberg; Sir W. MacCormac, Bart., K.C.V.O., London; Prof. Martin, Berlin; Prof. Nothnagel, Vienna; Prof. Osler, Baltimore; and Sir W. Turner, F.R.S., Edinburgh.

AN egg of *Aepyornis maximus*, measuring nearly a yard in circumference, was sold at Mr. J. C. Stevens's auction rooms on Tuesday, the price realised being forty-two guineas.

WE regret to see the announcement of the death of Dr. Edward Orton, the distinguished geologist, and president of the American Association for the Advancement of Science.

SIX public lectures on "England in South Africa," illustrated by maps and lantern slides, will be given at the Imperial Institute on Thursday evenings during this month and next, by Mr. Basil Worsfold. The first lecture will be delivered this evening.

WE learn from *Science* that Mr. J. B. Hatcher, and his assistant Mr. O. A. Peterson, have returned from their third exploration of Patagonia, where they were sent by the Geological Department of Princeton University. Very extensive collections have been made of both vertebrate and invertebrate fossils of Patagonia, and much material illustrating the zoology and botany of that region has been obtained.

THE leases of the auriferous deposits of the north-western shore of the Sea of Okhotsk, in Siberia, recently discovered and explored by a special commission sent into the region referred to by the Russian Imperial Government, are to be put up for auction at St. Petersburg in February 1900. The conditions of the leases may be seen on application at the Intelligence Branch of the Commercial Department of the Board of Trade.

IT is stated by the *Daily News* that Prof. Starr, of Chicago, who for many years has made a study of the ethnographical aspects of the interior of Mexico, has presented his valuable collection of objects, gathered during various expeditions into the heart of Mexico, to the Folk Lore Society, and the latter have, through the medium of their president, Mr. E. Sidney Hartland, offered to place the collection on permanent deposit in the Museum of Archaeology and Ethnology at Cambridge.

THE new session of the Society of Arts will be opened on November 15 with an address from the chairman of the Council, Sir John Wolfe Barry, K.C.B., F.R.S. In it it is probable that he will develop the subject of his address last year, "London Communications," and will make some suggestions as to the practical means of carrying his proposals into effect. The first paper after the opening meeting will be by Mr. D. E. Hutchins, who will draw attention to the want in this country of measures for the proper conservation of woods and forests. At the next meeting Mr. Allan Wyon will give a paper, principally of an antiquarian nature, on the Great Seals of England. At the other meetings before Christmas it is probable that Mr. Joseph Cash will describe the substitutes which have recently been introduced to replace silk, and the methods of their production. Mr. F. G. Afslalo will draw attention to the necessity for some legislation to restrict sea anglers from catching immature and undersized fish; and Mr. H. Bloomfield Bare will describe and illustrate the methods, which have recently achieved considerable success in America, of teaching drawing by the use of the blackboard, both hands being employed. Mr. H. H. Cunyngame, who has devoted a great deal of attention to the subject, will give a course of Cantor Lectures before Christmas on the art of enamelling. It is intended to demonstrate practically the whole process of enamel-making during the course. The Juvenile Lectures will be by Mr. Herbert Jackson, of King's College, who will lecture on phosphorescence.

AN important article on Mangabeira rubber appears in the current number of the *Kew Bulletin*. Partly in consequence of an improvement in the purity of the rubber, the price has recently advanced and the price of the best sorts is not much less than that obtained for Para rubber. The chief centres for export of Mangabeira rubber are Bahia and Pernambuco. Although but little is known so far of the cultivation of Mangabeira, it may be said that there is a considerable probability of its becoming an important tree in rubber-culture. The apparently easy accommodation of the tree to soil and climate, its early and considerable yield, together with the fact that even under the rough treatment of the Indians it preserves its fruitfulness, and also the facility with which it can be cultivated, promise a future. And, taking a wide view of its possibilities, from its presence in the red coffee-growing soils of the west of the Province of São Paulo, it appears suitable for the red earths of the German colonies of Africa, Usambara and Togoland alike, such, for instance, as occur at Misahöhe in the latter Colony. For these soils it promises to be considerably better suited than the Ceara rubber plant and the Para rubbers, and will probably give better results than *Castilloa*, than which it is more hardy, earlier maturing, and smaller.

THE information at present available on the subject of injurious insects in India forests is brought together in an illustrated pamphlet (pp. 152) by Mr. E. P. Stebbing, which has been issued from the office of the superintendent of Government printing, Calcutta. Locusts and white ants or termites are among the most destructive pests of the insect kingdom. The former invades the fertile plains of India from its home in the sandy deserts of Rajputana, Sind, and the Punjab,

and in the line it takes not a green leaf or shoot is left either in the forest or field. It is pointed out that as the life-history of the pest readily proves that forests and moisture are its greatest enemies, the reclamation of arid sandy areas by means of plantations would tend to check its multiplication. As to the white ant, though it is a most unwelcome intruder in any building, it renders service to man in the forest by rapidly converting fallen branches, dead trees and decaying wood of all kinds into mud, each particle of wood eaten being replaced by earth. Where termites are numerous, the insects only feed on the outer dead portions of the bark of the trees, and do no damage to healthy trees. The instinct of these insects is marvellous. Mr. Stebbing states that he has often noticed that should a tree have a dead branch on its trunk, no matter at what elevation, an earthen gallery is run up by the white ants, and the branch attacked, the decaying wood being replaced by soil, which soon falls to the ground.

A NOTE on a new departure which has been made in connection with the artificial hatching of salmon in Norway appears in the *Journal* of the Society of Arts. Formerly the young fry were allowed to escape as soon as they began to require food, and, therefore, when in a very delicate and defenceless condition. They are now retained in captivity, and fed four times a day upon the raw liver of slaughtered animals, until the autumn, after the system which obtains in America. According to Consul Nelson, of Bergen, the results of the first year's experiment at the Government hatchery on the Drammen were satisfactory; on 280,000 ova treated, the loss was only 2 per cent., and in the middle of October about 211,000 fry were turned out, while the percentage of loss has been still further reduced of late years. A belief is prevalent among the coast fishermen that salmon and sea-trout spawn successfully in salt water, and in this connection a series of experiments were conducted under proper supervision, from which it appeared that (1) roe taken from salmon captured in a river, or from sea-trout which have remained until the spawning time in sea water, cannot be successfully developed in salt water, and (2) salmon and sea-trout roe impregnated in fresh water may be hatched out in brackish water containing a small percentage of salt up to eight or nine per mille—that is to say, rather less than one-third of the salt contained in the sea water on the Norwegian coast.

Few people are aware that a number of European rivers which were once almost destitute of fish are now well stocked with species propagated from fry obtained from America. An idea of the extent of the operations of the U.S. Fish Commission, by which this change has been brought about, may be obtained from an article in the *Scientific American*. About ten years ago young fry of American landlocked salmon were shipped to Scotland, and since then they have multiplied rapidly, much to the detriment of the Scotch fish. A shipment of American black bass fry was made to France for stocking the rivers and streams, and, like the American salmon in Scotch waters, they have flourished so marvellously that to-day they are quite common articles of diet at the French hotels and restaurants. The French streams, since the introduction of the American bass, have doubled in their productive value, and there is every reason for the French anglers to be grateful to the U.S. Fish Commission for stocking their waters with a new species of food fish. Other varieties of fish have been shipped to France and elsewhere for scientific experiments. The American rock bass has been introduced into several English streams, and the American brook trout is to-day in flourishing condition in the clear, cold streams of Russia and other northern countries of Europe. The waters of Switzerland abound with many American common river and brook fish, which make the

angling there superior to anything in the past. It is even reported that the fine American muskallonge has found a satisfactory home in the Rhine and Danube rivers.

WE have received the Report of the Meteorological Commission of the Cape of Good Hope for the year 1898, a folio Blue Book of 168 pages, containing valuable results of meteorological observations made under the direction of the Commission, which has been collecting systematic information since the year 1861. The system now embraces two stations of the first order, 54 of the second order (barometric stations), 17 thermometric stations and 370 rainfall stations. These include observations made in the South African Republic, the Orange Free State, and at various other stations outside Cape Colony. The most noteworthy feature of the present Report is the inclusion of returns from the splendidly equipped station established by the De Beers' Company at Kenilworth, near Kimberley, at which hourly observations have been made during the whole year. It is believed that this is the only station of its kind, not only in South Africa, but in the whole African continent. An interesting ocean-current bottle notice was found on the coast, about latitude $34^{\circ} 2'$ south, and longitude $20^{\circ} 47'$ east. It was thrown from the *Blengfell* in latitude $39^{\circ} 58'$ south, and longitude $23^{\circ} 22'$ east, and had taken two years one hundred and thirty days in travelling $4^{\circ} 56'$ north and 35° east, having evidently been caught in the Agulhas current. Among other useful information, the Report contains notes on the weather of each month and the whole year, drawn up by the Secretary, with a series of diagrams giving the mean monthly rainfall over the whole Colony, with the percentage differences from the means for ten years (1885-94).

THE Report on the administration of the Meteorological Department of the Government of India in 1898-99, which has just been issued, is divided into two parts: (1) a general account of the more important work of the department, and (2) details of administration. The total number of stations (including four first-class observatories) amounted to 174, and the number of rainfall stations from which monthly statements have been published was 2280. Seismographs have been established at three suitable observatories, and a brief list of the earthquake shocks is now given in the *Monthly Weather Review*; a full account of the work done is promised in the next year's Report. Some important observations of the direction and velocity of the upper clouds have been made, and the results will be published in due course. The seasonal forecasts, based on the snowfall of the mountain districts, show only a moderate agreement with the actual weather experienced, but storm warnings appear to have been carried out very satisfactorily, timely warning being given of all the more important storms which visited the Indian coasts; the opinions of the warnings of floods are also generally satisfactory. The Department is greatly assisted in its useful work by the liberality of the Eastern Telegraph Company, and the Indo-European Telegraph Department, for the concession of free telegrams from Aden and Persia.

IN the Bradshaw Lecture, delivered before the Royal College of Physicians of London on November 2, and published in the *Lancet*, Dr. A. Foxwell points out that the first result of exercise is an increase in the rate and depth of the respirations—that is, of the respiratory exchange. The respiratory quotient, CO_2/O_2 , is not increased, but if anything diminished: in other words, the tissues are as rich (or richer) in oxygen during exercise as during rest. This necessitates a great increase in the absorption of oxygen at this time; for it has been shown that a man gives off ten times as much carbonic acid when on the treadmill as he does when asleep. But it is a remarkable fact that arm work, per unit of work done, requires a greater

absorption of oxygen than climbing, and climbing than walking on the level. If the amount of oxygen absorbed during sleep per minute be 100 grams, then in a minute's walking at three miles an hour on the level it would be 500 grams; in climbing a yard high 5000 grams, and in doing the same amount of kilogram metres by turning a wheel (arm work) 7000 grams. Such an enormous increase in the absorption of oxygen and giving out of carbonic acid must seriously strain the resources of the organs concerned. Dr. Foxwell considers that the lungs and the right ventricle of the heart bear the brunt of the extra labour involved in short strenuous exertions.

IN the *Physical Review* for September, Messrs. W. O. Atwater and E. B. Rosa give the first part of a paper describing a new respiration calorimeter and certain experiments made with it on the conservation of energy in the human body. The apparatus described has been devised and the methods of experimenting have been elaborated for use in inquiries bearing (1) on the question as to whether the principle of conservation of energy holds good in the living organism, and (2) assuming this law to be true, on the acquisition of more definite knowledge of the ways in which the body is nourished and of the values and uses of food. We would suggest that in experiments upon the living organism, the second law of thermodynamics opens up a much more interesting field of study than the first law. It has been suggested that vital processes afford the most likely region in which to seek for the existence of Maxwell's "demons," and should their non-existence be established, information as to the relative efficiency of the human individual as compared with a perfectly reversible thermodynamic engine is much to be desired.

THE Soulages Canal, which has recently been opened for traffic, completes the scheme for providing a 14-foot water-way from the Great Lakes to Montreal, in place of 9-feet, which previously had been the ruling depth for the navigation. It is considered that owing to the increased size of the vessels which will now be able to reach Montreal from the Great Lakes, the price of conveyance of wheat and other products of the North-west will be so reduced as to lead to the diversion of the principal part of the traffic which now finds its way to this country through America by the Erie Canal and New York. The St. Lawrence has been dredged and deepened below Montreal, so that large ocean-going vessels navigate the river up to that city, which has become the head both of the ocean and inland navigation. The Soulages takes the place of the old Beauharnois Canal, it being found less costly to construct an entirely new water-way over this length than to widen and deepen the old one. The new canal connects Lake Francis with the Ottawa River. The fall in this length is 82 feet, which is overcome by four locks, this descent forming about half the total fall between Lake Ontario and the St. Lawrence. Electricity is used for lighting the locks and for operating the machinery for opening and closing the gates and sluices. The canal has cost 1,000,000*l.*; the total sum expended by the Dominion on the improved water-ways amounting to nearly 8,000,000*l.*

THE current number of Petermann's *Mittheilungen* contains a valuable paper on the fundamental lines of structure of the Eastern Alps, by Dr. C. Diener. An examination of the new material collected during the last few years leads the author to the opinion that the old division of the Eastern Alps into three zones, one crystalline and two limestone zones, is inadequate: the division is rather into five zones, which radiate eastward. The "Flysch" zone forms part of a tectonic unit running to north-eastern Switzerland and the western Alps, next comes the northern limestone zone, and then the central zone, which

is made up of a number of different parts. The fourth zone is the "Drauzug" of Suess, and the fifth the southern limestone zone.

THE Smithsonian Institution has just issued a reprint of two old papers, by Dr. Otis T. Mason, on the Latimer Collection of Antiquities from Porto Rico, and on the Guesde Collection from Pointe-à-pître, Guadeloupe. There seems to be some doubt whether the wonderful examples of stone carvings were the work of Caribs or of their more peaceful neighbours; the evidence seems rather to point in favour of the former view. At Porto Rico are found mammiform stones which consist of a human or animal image associated with a conical projection; there are also found so-called "collars." These are slender ringed stones shaped something like a horse-collar; they average about seventeen inches long and twelve inches wide. They are beautifully worked and usually decorated with elaborately carved panels; the significance of these two groups of objects is unknown. Those interested in aboriginal stone-work should consult these papers, which have numerous illustrations; those in the second paper are in that queer dotted American style in which even contour lines are usually omitted. The wonderful results that can be obtained by savages without metal tools are here well demonstrated.

WE have received the parts of the Brazilian journal *Lavoura* for May, July and August 1899. They include articles on imported insect-pests, the Soja bean, agriculture, and various other observations, mostly illustrated, principally of local agricultural interest.

THE seventh edition of Foster and Langley's well-known "Course of Elementary Practical Physiology and Histology" (Macmillan) differs in several respects from preceding editions. Most of the lessons have been rewritten, a few have been added, and the lesson on the dissection of the rabbit and dog has been omitted. Dr. L. E. Shore has revised and rewritten the portions of the book dealing with chemical physiology, and with the physiology of muscle and nerve, and his name appears with Dr. Langley's, on the title-page, as joint editor of the new edition. The volume will doubtless be as widely used and appreciated in the future as it has been for more than twenty years.

WE have received from Mr. C. L. Wragge, chief of the Weather Bureau, Brisbane, a set of weather charts of Australasia for January 1898. The isobars are extended seawards over the Great Australian Bight and to New Zealand. These curves are to a great extent problematical, as indicated by the broken lines, and even over the land they appear to have been drawn from insufficient data in the western and north-western districts; the charts are also too much after date to be of general interest. We should prefer to see charts drawn by each Colony separately, from its own materials, and published within reasonable time after date.

THE additions to the Zoological Society's Gardens during the past week include a Macaque Monkey (*Macacus cynomolgus*, ♂) from India, presented by Mr. Charles Dallas; a Vulpine Phalanger (*Trichosurus vulpecula*) from Australia, presented by Mr. D. Woosman; a Shag (*Phalacrocorax graculus*), European, presented by Mr. E. S. Montague; a Herring Gull (*Larus argentatus*), two Glaucous Gulls (*Larus glaucus*), European, presented by Mr. H. J. Pearson; seven Cape Scorpions (*Opisthophthalmus capensis*) from South Africa, presented by Dr. W. F. Purcell; a Cardinal Eclectus (*Eclectus cardinalis*) (habitat?), a Grand Eclectus (*Eclectus roratus*) from Moluccas, a Mealy Amazon (*Chrysotis farinosa*) from South America, four Blanding's Terrapins (*Emys blandingi*), five Prickly Trionyx (*Trionyx spinifer*) from North America, deposited; twelve Golden Carp (*Carassius auratus*), European, purchased.